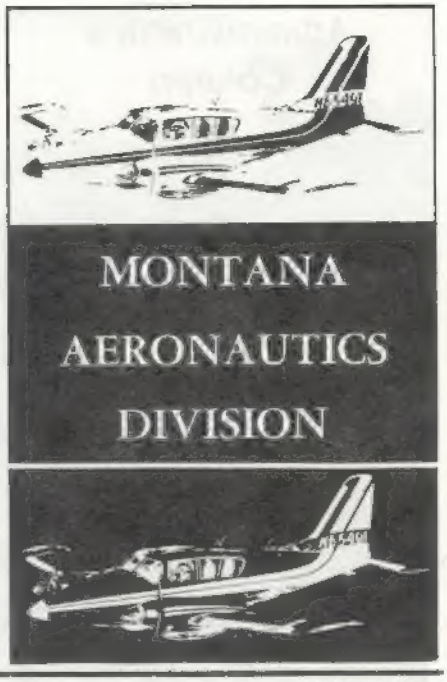
Will Mavis explaining the technique in using the communication radio at the Pilot Pinch Hitter Course sponsored by the Montana 99's last March.



VOL. 29, No. 7 MONTANA AND THE SKY JULY, 1978

SCHOLARSHIPS AWARDED TO OUTSTANDING STUDENTS

Kelly Johnson is a graduate of Francis Irle's aviation class at Glasgow High School. She received a 97 on her FAA Private Pilot Written Examination. I think that this reflects two special achievements; 1) diligent effort on her part in studying, and 2) excellent teaching on the part of Francis Irle. Kelly plans on pursuing her commerical license and making aviation her career. We wish her all the luck in the world with her aeronautical goal.

Kelly Johnson, Glasgow, scholarship winner.

On the other side of the state another student graduated from a high school aeronautics class, this time with a grade of 93 on the FAA Commercial Pilot Written Examination. This student is Dan Durado, an excellent product of some excellent teaching by Jack Foust at Kalispell High School.

Dan Durado, Kalispell, scholarship winner.

These two students deserve a lot of credit for a job well done, and will each be entitled to a $250 scholarship from the Aeronautics Division.

BAKER BREAKFAST FLY-IN

The Baker Hangar Club is sponsoring a breakfast fly-in August 27, starting at 8:00 a.m. A big ranch breakfast (yes — BIG — pancakes, eggs, bacon, the whole works!) will be served free of charge to all fly-ins. After breakfast there will be pilot events for all those who wish to participate. Contact Fred C. Williams for further details — (406) 778-2508. Plan on attending as it should be a great time for everyone.

NAMMACK RESIGNED

John A. Nammack, executive vice president of the National Association of State Aviation Officials for the last six years, has resigned from NASAO June 15, 1978, to pursue other aviation interests.

NASAO President Grover Jones complimented Nammack on his leadership in State Aviation since 1972 and encouraged him to continue supporting total aviation in his future endeavors.

Administrator's Column

I attended the Miles City Airport rededication ceremonies held July 8 and 9. Miles City honored Frank Wiley by renaming the airport Frank Wiley Field at the airport ceremonies Sunday afternoon. A banquet was held Saturday night honoring Mr. Wiley with many of his long time friends respectfully roasting him. Many early day aviation pioneers were present to honor Frank during this historical occasion and it was a great honor for me to be asked to take part in the banquet ceremonies.

I want to commend Dr. Lloyd Bowman and all the other folks in Miles City for their tremendous effort and their recognition of the accomplishments of this true aviation pioneer. There were many who put forth time and energy to make this dedication a success in honoring their home town boy. I would also like to congratulate Frank as he is most deserving of this recognition. Due to the time factor involved in processing pictures, we will not be able to run an article on the dedication in this issue. Look for it in the August newsletter.

* * * * *

I wish to urge all of you to attend the annual Schafer Meadows Fly-In on July 22 and 23. Herb Sammons, MPA representative serving on the Aeronautics Board, is chairing this fly-in and is setting aside a short work session on Saturday afternoon. We will use this work session to pick rocks from the runway, fill in holes, and clean up the camp grounds. Ted Mathis and Frank Fleisner have made four new camp fire grates which we will bring along to be permanently installed.

I visited the Schafer Meadows airstrip a couple of weeks ago and was disgusted and somewhat saddened to find that people had left the campsite in disarray. Although I am sure that it was not flyers who were responsible, we probably will get the blame. So it is most important that we all adhere to the unwritten code — "Fly it in and fly it out."

* * * * *

The Aeronautics Board held the Wyoming Airlines hearing on June 22. Wyoming Airlines has applied for a Certificate of Public Convenience and Necessity to serve Billings from Denver with intermediate stops in Wyoming. The final action of the Board has been delayed pending receipt of additional documentation to be submitted by Wyoming Airlines.

The Board held their regular meeting on June 23 at which time Dean Sparkman of Big Sky Airlines presented their financial certification to the Board. This was a condition set forth by the Board persuant to the issuance of the Big Sky Airlines Certificate. Big Sky now has been given the full go ahead to commence their scheduled airline service to Billings, Helena and Kalispell beginning September 1.

* * * * *

I wish to congratulate Bernice Peacock and Dick Baldwin on their retirements effective July 1. The Aeronautics Board hosted a picnic on June 23 to honor them. The board, along with the Aeronautics Division presented Bernice and Dick with retirement gifts. I would like to thank both Bernice and Dick for their many years of faithful and dedicated service to Montana aviation. I am sure they will be missed not only by the Aeronautics Division, but also by the entire Montana aviation community as well. Paula will feature a biography on both Bernice and Dick in our next issue.

Richard O'Brien, Chairman of the Aeronautics Board (left), presenting Dick Baldwin with a saddle blanket and lead rope as a gift for his retirement.

DEPARTMENT OF COMMUNITY AFFAIRS

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Phone 449-2506
Box 5178
Helena, Montana 59601

Michael D. Ferguson
Administrator

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BERNICE PEACOCK AND DICK BALDWIN RETIRE FROM AERONAUTICS DIVISION STAFF.

The Montana Aeronautics Board presenting Bernice Peacock with a lounge chair as a gift upon retirement. Left to right, Richard O'Brien, Bruce Vanica, Merle Thorstad, Bernice Peacock, Herb Sammons, Charles Marshall (standing), and Bill Merrick.

Bernice Peacock displays pleasure in receiving her new wooden rocking chair presented to her from the Aeronautics Division staff as a gift for her retirement.

Dick Baldwin showing off his new saddle bags given to him by the Aeronautics staff upon his retirement.

MONTANA AERONAUTICS

Bernice Peacock and Dick Baldwin joined by the Aeronautics Division staff at their retirement party.

CENTERLINE

By: **Jim White**, Chief
Air Transportation Bureau

Engine Care

There is firm evidence that engines not flown frequently may not achieve the normal expected overhaul life, according to the "Lycoming Flyer." Engines flown only occasionally deteriorate much more rapidly than those which fly consistently. In view of this, Lycoming accompanies its listed overhaul life in Service Instruction No. 1009 for all models with the statement that the engines must be flown at least 15 hours per month. Pilots have asked — What really happens to an engine when it's flown only one or two times per month? An aircraft engine flown this infrequently tends to accumulate rust and corrosion internally. Some operators are running the engines on the ground in an attempt to prevent rust between infrequent flights. This may harm rather than help the engine if the oil temperature is not brought up to approximately 165° F, because water and acids from combustion will accumulate in the engine oil. The one best way to get oil temperature to 165° F is to fly the aircraft, for during flight the oil gets hot enough to vaporize the water and most of the acids and eliminate them from the oil. If the engine is merely ground run, the water accumulated in the oil will gradually turn to acid, which is also undesirable. Prolonged ground running in an attempt to bring oil temperature up is not recommended because of inadequate cooling which may result in hot spots in the cylinders, or baked and deteriorated ignition harness, and brittle oil seals causing oil leaks. If the engine can't be flown, then merely pull it through by hand, or briefly turn the engine with the starter to coat the critical parts with oil. If the engine is flown infrequently, the oil should be changed at least every 25 hours to eliminate the water and acids.

* * * * *

Safety Tips

1. Let someone know where you're going, when you expect to get there and when you expect to return.
2. Check the ELT in your aircraft to make sure it works. (Follow prescribed test procedures.)
3. Carry survival equipment in the aircraft (matches in a waterproof container, a small candle — it is easier to keep going, a container to heat water in, dried foods, sugar lumps, plastic yard bag, gloves, blanket, a knife, first aid kit, some twine.) You may want to add other things.
4. Dress appropriately — even in relatively mild weather, exposure can be a serious enemy.
5. Stay with the downed aircraft — it is easier to spot than you are. You should be wise to do this even when you think you know the area.
6. Your mind is the best survival tool. Stop and think before you do something. Don't panic!

* * * * *

Murphy's Laws Applied To Flying

It has long been known in the engineering field that Edsel Murphy's Law is the foundation of all design. Most people recognize the basic form of Murphy's law, "If anything can go wrong, it will."

Murphy's laws have been found to apply equally well to aviation; and a small sample is given below:

A. Flight
   1. Bumpy days and passengers with weak stomachs will always coincide.
   2. Aircraft availability is inversely proportional to the importance of a particular flight.
   3. All warranty and guarantee clauses become void upon payment or just prior to failure, which ever comes first.
   4. On a long cross-country, home base will always be 5 minutes beyond the maximum range of the aircraft at the last planned fuel stop.
   5. Wind aloft reports will only be accurate in the cases of direct headwinds.
   6. Operating Manuals will express important performance figures in the least usable form.
   7. Answers on the FAA written examination will all be equidistant from your computed answer. Decimal points will always be misplaced.
   8. Factory manuals will be wrong by a factor of 0.5 or 2.0, whichever gives the most optimistic results. For salesmen's claims these factors are 0.1 or 10.0.
   9. On overwater flights or over rough terrain, the engine will go into autorough at the midpoint ± 10 minutes.
   10. Control tower trainees will not be allowed to exercise command except on weekends and other high traffic volume times.

B. Maintenance, Mechanical
   1. A dropped tool will hit a spot where it will do maximum damage (Murphy's Law of Selective Gravitation).
   2. After an inspection plate with 16 screws has been removed, it will be discovered that it was the wrong plate.
   3. After 16 screws have been replaced in an inspection plate, the gasket will be found on the bench.
   4. Any cable cut to length will be too short.
   5. Tolerances will accumulate towards maximum difficulty of assembly.
   6. Interchangeable parts won't.
   7. The component most likely to fail will be the least accessible.

C. Maintenance, Electrical
   1. A fail-safe circuit will not only fail, it will destroy others as it does so.
   2. Self-starting oscillators won't.
   3. A transistor protected by a fuse will protect the fuse by blowing first.
   4. Intermittent faults will remain so for the service life of the equipment.
   5. If a particular component is needed, it will be out of stock. Further, it cannot be made from available supplies.

(Thanks to Pireps, Nebraska Department of Aeronautics)

Will Mavis, FAA, demonstrating the communication radio at the Pilot Pinch Hitter Course sponsored by the Montana 99's last March.

RADIO USE AND LIFE

The FAA tells us that a spokesman for one of the major aircraft radio manufacturers is advising pilots that turning off aircraft radios in flight does not prolong their lifespan. The manufacturer believes that avionic equipment will actually last longer if it is kept running whenever the airplane engine is running, and estimates that a regularly-used radio may last three times as long as one used only rarely. Other factors that contribute to a long life for radio equipment include proper installation, particularly proper grounding and adequate cooling. Lack of the latter is considered the greatest single contributer to aircraft radio problems (and in many cases could void the warranty of new radios).

VARIEZE VISITS YELLOWSTONE

By: **Ted Mathis,** Manager
Yellowstone Airport

On June 12, 1978, the Yellowstone Airport was visited by a strange looking homebuilt aircraft known as the Varieze. The Varieze was designed by Burt Rutan of Mojave, California and built in the Canard-Pusher configuration as was the Wright brothers first airplane. It is powered by the Continental 0-200 engine of 100 horsepower and is capable of maximum cruise over 200 miles per hour and a climb rate of over 1700 feet per minute. Fuel consumption is about 5 gallons per hour at cruise rate with an 800 mile range. It carries 23 gallons of gas.

The plane that visited the Yellowstone Airport was built by Donald Shupe of La Verne, California and is hangared at Chino. The empty weight of the aircraft is about 630 pounds, with a gross weight of 1120 pounds.

It took eighteen months and about 2500 hours to complete the aircraft. Construction is hotwired styrofoam for the wings and canard covered by fiberglass and epoxy resin. The fuselage is hand formed polyurethane foam with glass and epoxy.

Mr. Shupe informed us that his aircraft had been reported as a UFO on four occasions while flying over California. A look at the accompanying pictures show how this could easily happen. Even with two people and full fuel the Varieze used less than 2000 feet of runway to become airborn at our 6644 foot elevation.

We just received a card from Mr. Shupe telling us that he had a good trip back to California and that he hopes to visit us again. Our thanks to him for the information regarding his unique aircraft.

CALENDAR

July 22 & 23 — Schafer Meadows Fly-In.

August 6 — Air Show, Livingston.

August 27 — Baker Breakfast Fly-In. Contact Fred Williams (406) 778-2508 for further details.

Oct. 2-4 — American Association of Airport Executives' Annual Airports Conference, University of Oklahoma, Norman, OK.

Oct. 6-8 — Montana Flying Farmers Convention, Havre.

Oct. 12-15 — Third Annual Mid-America Fly-In and Annual Membership Meeting of National Pilots Association, Point Lookout, Missouri.

Oct. 24-26 — Aviation Maintenance Foundation, First Annual Symposium, Oklahoma City, OK — Contact Richard Kost, P.O. Box 739, Basin, WY 82410 (307) 568-2466.

Oct. 28 — Second Annual Great Falls to Jackpot "Helloween Air Race." Contact Patti Thompson, 2824 Fourth Avenue South, Great Falls 59405 for further details.

Varieze with nose wheel stowed for tie down.

Varieze taxiing out for departure at Yellowstone Airport.

OUT OF THE PAST

Just some of the thousands who turned out for the ceremonies which marked the beginning of scheduled airline service to Sidney, Montana. On September 15, 1954, the first of Frontier Airlines DC-3's began twice daily air service to this aggressive eastern Montana city.

Oil activity in the Williston Basin assured new service by Frontier to link Wolf Point, Sidney, Glendive and Miles City with Billings and the rest of Montana served by scheduled airlines.

ACCIDENT STATISTICS

A series of 11 reports which break down 1976 civil aviation accident statistics by type of aircraft or accident, kind of flying or accident cause was released this month by the National Transportation Safety Board.

Each of the publications includes computer-printed accident "briefs" which give the basic accident facts, probable cause, and contributing factors, if any, for all of the 1976 accidents in its category. Also incorporated are statistical tables analyzing the accidents by type, injury, and cause.

One publication — "Listing of Aircraft Accidents/Incidents by Make and Model" — covers both airline and general aviation accidents. The other 10 involve non-airline flying in various phases of general aviation.

The 10 general aviation publications are entitled "Briefs of Accidents Involving . . .

Weather as a Cause/Factor
Midair Collisions
Alcohol as a Cause/Factor
Missing and Missing-Later-Recovered Aircraft
Commuter Air Carrier and On-Demand Air Taxi Operations
Corporate/Executive Aircraft
Aerial Application Operations
Turbine Power Aircraft
Rotorcraft
Amateur/Home Built Aircraft."

Single copies of these publications may be obtained without charge by writing to the Publications Branch, National Transportation Safety Board, Washington, D.C. 20594. Multiple copies may be purchased by mail from the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22151.

THEFTS INCREASE IN 1977

International Aviation Theft Bureau statistics for the year 1977 reflect a considerable increase in whole hull thefts — from 83 in 1976 to 100 in 1977 — of which 76 were single-engine aircraft and 24 were twin-engine planes.

California led the nation, reporting 26 aircraft thefts, followed closely by Arizona, with 22. The Cessna 210, having 31 incidents of theft reported, was by far the most popular target for aircraft thieves during 1977. Its nearest competitors were the Cessna 206, Cessna 182, and Piper Cherokee, with ten, nine and eight reports respectively. Estimated total value of stolen aircraft for 1977 is about six million dollars.

Avionics thefts also increased somewhat during 1977 from 79 reports — 312 units in 1976, to 85 reports — 377 units in 1977, representing an approximate total value of $390,000.

Listing of stolen and unrecovered aircraft and avionics may be obtained from the International Aviation Theft Bureau, Box 5800, Washington, D.C. 20014.

EDITOR'S COMMENT

I really appreciate the cooperation and help of the people throughout the state who have provided pictures for our newsletter. One thing I would like to point out regarding the photographs is that black and white reproduce much better than color. So, if possible, please submit black and white photos. You'll be able to recognize yourself better that way!

THUNDERSTORM FACTS

Thunderstorm season is upon us. More than 45,000 thunderstorms occur daily over the surface of the Earth. In the U.S., they occur most frequently between late winter and late fall, peaking in July and August. The thunderstorm is one of the most common natural events — it is also one of the most violent.

The obvious dangers that thunderstorms pose to aviators are severe turbulence, lightning, hail, icing, abrupt pressure changes, sudden wind shifts, and wind shear.

Only three conditions are necessary for thunderstorm formation: (1) unstable air, (2) high moisture content, and (3) lifting force. If all three exist in sufficient quantities, it may take less than 45 minutes to transform an everyday cumulus cloud into a violent storm over 35,000 feet in height.

Thunderstorm structure

A mature thunderstorm contains several convective cells. Each cell varies between one and five miles in diameter and has a life span of between 20 and 90 minutes. The circulation in each cell is independent of the surrounding cells in the same storm, and as storm development progresses, new cells are formed as older ones dissipate. These clusters of individual cells at various stages of development often cover an area over 100 miles in diameter and last for six hours or more.

The life cycle of a storm cell

Each storm cell passes through three distinct stages in its life cycle: (1) a cumulus or building stage, (2) a mature stage, and (3) a dissipating or anvil stage.

A thunderstorm always begins as a cumulus cloud. The main feature of the cumulus stage is an updraft that prevails throughout the entire cell. A thunderstorm in the cumulus stage may contain updrafts with speeds as high as 8,000 feet per minute, although speeds of 2,000 to 3,000 feet per minute are more common. Since a growing cumulus cloud can easily outclimb a light aircraft of average performance, a pilot should exercise great caution when flying over clusters of cumulus clouds as he tries to maintain VFR on top of a haze or cloud layer. In this situation, a pilot may find that he must continually climb as the clouds grow and thicken below the aircraft.

Generally, there is no rain at the surface during the cumulus stage of thunderstorm development because the water droplets are carried aloft in the updrafts, colliding with each other and increasing in size.

The advent of rain at the surface indicates the mature stage of storm development. This mature stage of an individual storm cell lasts between 15 and 30 minutes as compared to the 10 to 15 minutes of the cumulus stage. Mature storm cells usually attain a height between 30,000 and 50,000 feet. In the mature stage, the water droplets are so large they can no longer be suspended by the updrafts and fall to the ground. As they fall, the water droplets exert a drag on the air within the storm cells causing downdrafts that may reach a velocity of 2,500 feet per minute. As the downward-rushing air approaches the surface, it tends to spread out horizontally, causing strong, gusty surface winds, a sharp rise in barometric pressure, and a drop in air temperature.

The most violent conditions occur during the mature stage of thunderstorm development. Downdrafts exist directly adjacent to updrafts in each cell, and several cells in various stages of development within the storm cause severe turbulence, hail, wind shear, and heavy rain.

The dissipating or anvil stage is characterized by the gradual cessation of rainfall. The updrafts weaken, and a downdraft predominates throughout the storm cell. The downdraft gradually dissipates as the air source necessary to maintain it dissipates.

Thunderstorm types

All thunderstorms are the result of unstable, moist, rising air, and although they share the same general physical features, they may differ greatly in intensity, development, and associated weather phenomena. Thunderstorms are usually classified as either **frontal** or **air-mass** types.

Two types of storms results when air is heated by contact with a warm surface. When heat is radiated from the ground to the air above, convection begins and a thunderstorm may develop; this often happens on hot summer afternoons, especially in mountainous regions. Convection and associated thunderstorms may also occur when cool air moves over a warm body of water and is heated.

Thunderstorm weather

A heavy concentration of liquid moisture is abundant in nearly all mature thunderstorms, although not necessarily as falling rain. The water droplets may ascend in an updraft or be suspended, seemingly without motion. Liquid water has been found in some storm cells at altitudes as high as 40,000 feet where the temperature is well below freezing.

Hail may be found throughout a thunderstorm cell and is directly related to its vertical development and intensity. Damaging hail is often en-

(Continued on Next Page)

countered in clear areas outside the actual storm cell, especially below the overhanging anvil of a dissipating cell.

Severe icing is often encountered at or above the freezing level where large, supercooled water droplets exist. Severe icing is more prevalent during the cumulus stage of storm cell development.

Lightning strikes, while uncommon, may occur as an aircraft approaches a thunderstorm. Lightning strikes have been found to occur with the maximum frequency at about 16,000 feet and again at 20,000 feet.

Turbulence is a major thunderstorm hazard. Severe turbulence within the storm cell is a result of the frequency and intensity of vertical and horizontal gusts. Gust velocities have been recorded as high as 260 feet per second up and 160 feet per second down in a time span of 1/10 second. Gust intensity generally increases with altitude.

A mature thunderstorm often produces a gust front with associated low-level wind shear. This gust front may precede the actual storm cell by as much as ten miles and is most prevalent at altitudes near or below 5,000 feet.

Sudden wind shifts at the surface are another characteristic of thunderstorms. Surface winds may suddenly shift as much as 180 degrees and, in extreme cases, attain velocities of 90 knots prior to storm passage, making landing and takeoff operations hazardous in a wide area in front of an approaching storm.

A serious hazard associated with thunderstorms is sudden and marked variations in surface barometric pressure, which can cause serious altimeter errors in landing aircraft. Barometric pressure abruptly falls as a storm approaches and abruptly rises in the rainfall area due to downdrafts. Any altimeter settings received just prior to or during a thunderstorm may prove to be highly unreliable.

In a study of thunderstorms conducted in 1946, officials found that, in 24% of the storms studied, when an aircraft landed during the heavy rain period, the airplane would have been approximately 60 feet higher or lower than its altimeter indicated. In two instances, the altimeter would have read 140 feet higher based on settings received just minutes earlier. This situation, when coupled with the normal difficulties in accurately maintaining altitude under turbulent conditions, can be hazardous indeed!
(Courtesy Aviation Monthly, June issue)

MEMBER

NATIONAL ASSOCIATION OF STATE AVIATION OFFICIALS

PURPOSE—"**To foster aviation,** as an industry, as a mode of transportation for persons and property and as an arm of the national defense; to join with the Federal Government and other groups in **research, development,** and **advancement of aviation;** to develop uniform laws and regulations; and to otherwise encourage co-operation and mutual aid among the several states."

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